

Modular, Fault-Tolerant Electronics Supporting Space Exploration, Phase I

Completed Technology Project (2006 - 2006)



Project Introduction

AeroAstro's innovative design approach for implementing reconfigurable electronics frees the spacecraft designer to concentrate on the mission at hand with significant assurance that single-point failures can be automatically corrected. It also uses dynamic reconfiguration to change circuit functions which will create the opportunity to conserve mass, volume, and power while providing capabilities that may have been valuable, but deemed to be less important or infrequently needed so that they could not justify dedicated hardware. The system operates at a much finer level of granularity than with other reconfigurable approaches, which increases not the only adaptability and versatility, but also reduces the redundancy required to assure the success of the mission. Unlike traditional approaches that employ redundant systems, there are no mass penalties, and affordability is achievable. Significant benefits include dramatic orders of magnitude reduction in mass, volume, and cost.

Anticipated Benefits

Potential NASA Commercial Applications: Military systems, to destroy sensitive equipment if capture is imminent, to cloak equipment by stealth or to enable graceful degradation after battle damage. Electronic systems not used simultaneously can be combined into a single reconfigurable system. The aircraft industry. Critical system failure might cost hundreds of souls. Other transportation systems, including automotive, trucks, railroads, and ships. Power plants, electrical transmission/distribution systems, financial networks, homeland security-related systems. Medical systems, vital in operating rooms and other areas of hospitals, and personal electronic systems that sustain life benefit from increased reliability.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

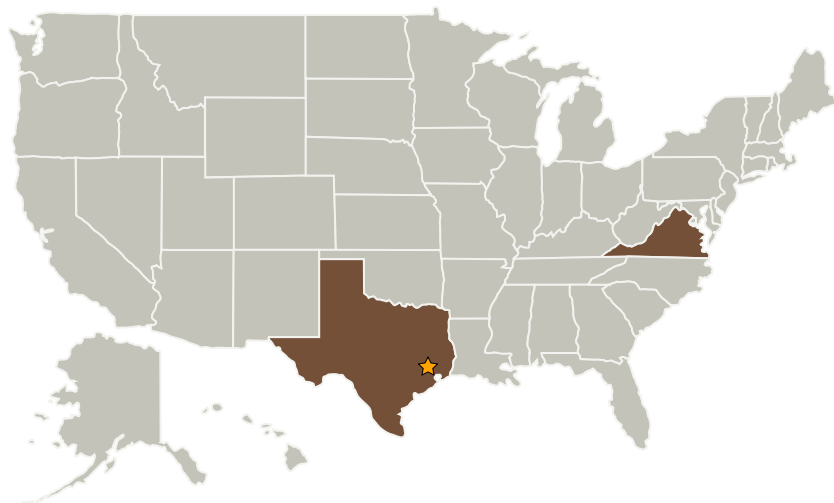
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
AeroAstro Corporation	Supporting Organization	Industry	Ashburn, Virginia

Primary U.S. Work Locations

Texas	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

William Seng

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.2 Mission Infrastructure, Sustainability, and Supportability
 - └ TX07.2.1 Logistics Management